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Memo

DATE: February 6, 2004

TO: RHIC E-Coolers

FROM: Ady Hershcovitch

SUBJECT: **Minutes of the February 6, 2004 Meeting**

Present: Ilan Ben-Zvi, Alexei Fedotov, Michael Harrison, Ady Hershcovitch, Jorg Kewisch, Derek Lowenstein, William Mackay, Christoph Montag, Thomas Roser.

Topics discussed: Simulation & Calculations, Status of Hardware

Simulation & Calculations: Alexei opened the meeting by describing work that he and Gregory Trubnikov had done to resolve discrepancies between the SIMCOOL and the BETACOOOL codes. Substantial changes were made in SIMCOOL and some changes were made in BETACOOOL. SIMCOOL is based on utilizing multiple scattering gas relaxation formulas while BETACOOOL has an extensive library of IBS formulas that incorporates accelerator lattice functions.

Gas-relaxation due to multiple small-angle Coulomb collisions was studied, and the differences with IBS were examined. It was found that the main difference is in the coupling of longitudinal and transverse degree of freedom in the IBS formalism. However, this coupling is important mostly below transition energies. When coupling is important, rate is dominated by transverse heating. But at high energy, velocity (in beam frame) is collapsed longitudinally. Consequently, heating is dominated by longitudinal rate and the importance of coupling diminishes. Therefore, gas-relaxation formulas can be used instead of complicated IBS formulas for problems when one has collapsed longitudinal distribution, e.g., IBS at high energies like in RHIC and electron beam cooling. Additionally, gas-relaxation formulas were incorporated in BETACOOOL. And, both SIMCOOL and BETACOOOL were used to calculate heating rates due to IBS and cooling. The results showed agreement between the codes.

Gregory Trubnikov from Dubna will present details of this study at the meeting next week.

Status of Hardware: in answer to Derek's question regarding the status of the hardware, Mike said that a set-up to study dipole corrections for the superconducting solenoid is in place. Although it is a "warm" system with a field that is smaller by two orders of magnitude, the errors are larger by the same order. Hence, it is adequate for the test.

Ilan said that the klystron and the beam dump would be ordered this fiscal year. The 1 MW klystron specifications are being prepared with the help of LANL experts as part of our collaboration with LANL. The gun is not ready for a purchase order yet, and probably will not be ready until the end of next fiscal year. A copper cavity prototype of the 5-cell ERL cavity should be ready for testing in May. In the meantime, to get practice in cavity measurements, we got a copper cavity from JLAB for practice.